

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Tomoo MURAKAMI

Divisional of Appln. No. 09/120,204
Filed: July 22, 1998

Group Art Unit: 3729
Examiner: L. Young

Appln. No.: Not yet assigned
Filed: January 16, 2002

Group Art Unit: not yet assigned

For: METHOD OF MOUNTING A SEMICONDUCTOR DEVICE TO A SUBSTRATE AND
A MOUNTED STRUCTURE

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Amend the specification by inserting before the first line the sentence:

This is a divisional of Application No. 09/120,204 filed July 22, 1998; the disclosure of which is incorporated herein by reference.

Page 1, fourth paragraph, which bridges to page 2, please delete and insert the following new paragraph:

Referring to Fig. 1, an insulating resin layer 2 made of a material such as rubber having elastic recovery force is formed on a substrate 1. Further, a mounting pad 3 is formed on the insulating resin layer 2 by means of sputtering or vapor deposition. A sealing resin 5 is coated to

a region on the insulating resin layer 2 in which a semiconductor device 4 is mounted to the substrate 1. On the other hand, a plurality of bump electrodes 6 are formed to the surface of the semiconductor device 4 facing the substrate 1.

Page 2, first full paragraph, please delete and insert the following new paragraph:

In the manufacturing method of the conventional mounting structure, at first, a plurality of the bump electrodes 6 disposed on the lower surface of the semiconductor device 4 and the mounting pad on the substrate 1 are aligned and then the semiconductor device 4 is bonded under pressure on the substrate 1. In this case, since the sealing resin 5 between the bump electrode 6 of the semiconductor device 4 and the mounting pad 3 on the substrate 1 is extruded, the bump electrode 6 and the mounting pad 3 are connected electrically with each other. In this conventional flip-chip mounting structure, since the insulating resin layer 2 having the elastic recovery force is formed between the substrate 1 and the mounting pad 3, electric connection between the bump electrode 6 and the mounting pad 3 can be held stably by the elastic recovery force of the insulating resin layer 2 and the contracting force of the sealing resin 5.

Page 4, second full paragraph, please delete and insert the following new paragraph:

To achieve the above objects, the structure for mounting a semiconductor device to a substrate comprises a mounting pad disposed on the substrate, a sealing resin provided on the substrate on which the semiconductor device is to be mounted, and a plurality of projecting electrodes disposed on a surface of the semiconductor device facing the substrate, and each of the projecting electrodes including a substantially spherical portion and a pointed portion in

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contact under pressure with the mounting pad and deformed such that a contact portion wit the mounting pad is enlarged from a point to a plane.

IN THE CLAIMS:

Please cancel claims 1-15, 20 and 21 without prejudice or disclaimer.

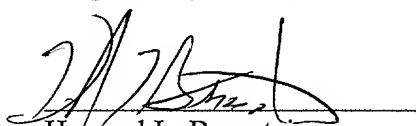
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REMARKS

The changes made to the specification correspond to those made and entered in parent application serial no. 09/120,204.

Entry and consideration of this Amendment is respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'H. Bernstein', is written over a horizontal line.

Howard L. Bernstein
Registration No. 25,665

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Date: January 16, 2002

APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification is changed as follows:

Amend the specification by inserting before the first line the sentence:

This is a divisional of Application No. 09/120,204 filed July 22, 1998; the disclosure of which is incorporated herein by reference.

Page 1, fourth paragraph, which bridges to page 2, please delete and insert the following new paragraph:

Referring to Fig. 1, an insulating resin layer 2 made of a material such as rubber having elastic recovery force is formed on a substrate 1. Further, a mounting pad 3 is formed on the insulating resin layer 2 by means of sputtering or vapor deposition. [An]A sealing resin 5 is coated to a region on the insulating resin layer 2 in which a semiconductor device 4 is mounted to the substrate 1. On the other hand, a plurality of bump electrodes 6 are formed to the surface of the semiconductor device 4 facing the substrate 1.

Page 2, first full paragraph, please delete and insert the following new paragraph:

In the manufacturing method of the conventional mounting structure, at first, a plurality of the bump electrodes 6 disposed on the lower surface of the semiconductor device 4 and the mounting pad on the substrate 1 are aligned and then the semiconductor device 4 is bonded under pressure on the substrate 1. In this case, since the sealing resin 5 between the bump electrode 6 of the semiconductor device 4 and the mounting pad 3 on the substrate 1 is extruded, the bump

electrode 6 and the [mounted]mounting pad 3 are connected electrically with each other. In this conventional flip-chip mounting structure, since the insulating resin layer 2 having the elastic recovery force is formed between the substrate 1 and the mounting pad 3, electric connection between the bump electrode 6 and the mounting pad 3 can be held stably by the elastic recovery force of the insulating resin layer 2 and the contracting force of the sealing resin 5.

Page 4, second full paragraph, please delete and insert the following new paragraph:

To achieve the above objects, the structure for mounting a semiconductor device to a substrate comprises a mounting pad disposed on the substrate, a sealing resin provided on the substrate on which the semiconductor device is to be mounted, and a plurality of projecting electrodes disposed on a surface of the semiconductor device facing the substrate, and each of the projecting [electrode]electrodes including a substantially spherical portion and a pointed portion in contact under pressure with the mounting pad and deformed such that a contact portion wit the mounting pad is enlarged from a point to a plane.

IN THE CLAIMS:

Claims 1-15, 20 and 21 are canceled.